

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(Article 36 and Rule 70 PCT)

Applicant's or agent's file reference 2271/78 WO	FOR FURTHER ACTION		See communication on the transmittal of the international preliminary examination report (form PCT/IPEA/416)
International file reference PCT/EP 03/06809	International application date (day/month/year) 27.06.2003	Priority date (day/month/year) 03.09.2002	
International Patent Classification (IPC) or national classification and IPC B60J10/00			
Applicant METEOR GUMMIWERKE K.H. BAEDJE GmbH & CO. et al.			

1.	This international preliminary examination report was established by the International Preliminary Examining Authority and transmitted to the applicant according to Article 36.		
2.	This REPORT consists of a total of 6 sheets, including this cover sheet.		
	<input checked="" type="checkbox"/>	The report is also accompanied by ANNEXES: these are sheets of the description, claims and/or drawings which have been amended and are the basis of this report, and/or sheets containing rectifications carried out before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions for the PCT)	
	These annexes include a total of 6 sheets.		
3.	This report contains indications relating to the following items:		
	I	<input checked="" type="checkbox"/>	Basis of the report
	II	<input type="checkbox"/>	Priority
	III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability.
	IV	<input type="checkbox"/>	Lack of unity of invention
	V	<input checked="" type="checkbox"/>	Reasoned statement under Rule 66.2 a)ii) with regard to novelty, inventive step and industrial applicability; documents and explanations supporting such statement.
	VI	<input type="checkbox"/>	Certain documents cited
	VII	<input type="checkbox"/>	Certain defects in the international application
	VIII	<input type="checkbox"/>	Certain observations on the international application

Date of submission of the demand 04.03.2004	Date of completion of this report 14.12.2004
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INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

International File Reference PCT/EP 03/06809

I. Basis of the report

1. With respect to the **elements** of the international application (*replacement sheets which have been furnished to the receiving office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report because they do not contain any amendments (Rule 70.16 and 70.17)*):

Description, pages

4, 5 as originally filed
1-3, 3a received on 01.10.2004 with a letter dated 30.09.2004

Claims, no.

1-6 received on 01.10.2004 with a letter dated 30.09.2004

Drawings, sheets

1/1 as originally filed

2. With regard to the **language**: all the elements mentioned above were available to the Authority in the language in which the international application was filed or were filed in this language unless stated otherwise at this point.

The elements where available to the authorities in the _____ language or were filed in this language; this language is:

- ☐ the language of the translation which was filed for the purposes of the international search (according to Rule 23.1(b)).
☐ the language of publication of the international application (according to Rule 48.3(b)).
☐ the language of the translation which was filed for the purposes of the international preliminary examination (according to Rule 55.2 and/or 55.3).

3. With regard to the **nucleotide and/or amino acid sequence** disclosed in the international application the international preliminary examination has been carried out on the basis of the sequence listing which:

- ☐ is contained in written form in the international application.
☐ was filed together with the international application in computer-readable form.
☐ was filed with the Authority subsequently in written form.
☐ was filed with the Authority subsequently in computer-readable form.
☐ The statement that the written sequence listing filed subsequently does extend beyond the content of the disclosure of the international application at the time of the application has been submitted.
☐ The statement that the information presented in computer-readable form corresponds to the written sequence protocol has been submitted.

4. By reason of the amendments the following documents have been cancelled:

- ☐ description, pages:
☐ claims, no.:
☐ drawings, sheet:

INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

International File Reference PCT/EP 03/06809

5. ☐ This report has been established without consideration (of some) of the amendments since, for the reasons stated, these extend, in the Authority's opinion, beyond the content of the disclosure as originally filed (Rule 70.2(c)).

(Reference is made under Point 1 to replacement sheets which contain such amendments; they are to be enclosed with this report.)

6. Any additional comments:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; documents and explanations supporting such statement.

1. Statement
- | | | | |
|-------------------------------|------|--------|-----|
| Novelty (N) | Yes: | Claims | 1-6 |
| | No: | Claims | - |
| Inventive step (IS) | Yes: | Claims | 1-6 |
| | No: | Claims | - |
| Industrial applicability (IA) | Yes: | Claims | 1-6 |
| | No: | Claims | - |

2. Documents and statements:

See insert

INTERNATIONAL PRELIMINARY
 EXAMINATION REPORT

International File Reference PCT/EP 03/06809

V. Reasoned statement

V.1 Prior Art

Reference is made to document EP 0836962 A (D1). This document is considered as the closest Prior Art.

The claimed invention substantially differs from the closest Prior Art by virtue of the fact that in the invention the inner tubular profile of a sealing profile that consists of two tubular profiles that are disposed one inside the other consists of silicone. In D1 another material is used for the inner tubular profile.

V.2 Technical object

A sealing profile of the above described type is to be provided with regard to an improved recovery after a long period of pressure deformation.

V.3 Achievement of the object

The described object is achieved in the invention by the particular combination of materials in the sealing profile. The outer tubular profile is chosen according to its surface properties and the inner tubular profile is chosen in accordance with its resilient restoring force. The use of silicone as the material for the inner tubular profile permits a high restoring force and a quick recovery after a long period of pressure deformation, even under thermal stress.

Document D1 discloses a sealing profile of the same type as the invention, wherein two tubular profiles are likewise disposed one inside the other and their materials are also chosen according to the same provisos. However, in D1 only a cellular, thermoplastic material having a lower density is used for the inner profile. The use of silicone is not disclosed in D1 and can not be considered as obvious for the person skilled in the art.

Consequently, the described object is achieved by the combination of features in the independent Claim 1, said combination not being known from the Prior Art. This Claim, as well as the dependent Claims 2 to 6 can thus be considered as new, inventive and susceptible of industrial application in terms of Article 33(2)(3)(4) PCT.

V.4 Clarity

The application does not fulfill the requirement of Article 6 PCT because the **independent Claim 1** is not clear.

In the characterizing part of this Claim it is stated that the tube-like construction of the sealing profile in accordance with the invention consists of two tubular profiles that "**can be connected** to each other".

The term "can be connected" gives the impression that the two tubular profiles may be connected but are not necessarily connected. Reference is thus made to a possible structure or assembly of the profiles, the construction of the sealing profile thus remaining unclear, however.

It can be seen from the description and the drawings that independently of the materials and production methods used, the tubular profiles of the claimed sealing profile are always **connected** to each other.

V.5 Further comments

Although the independent Claim 1 is drafted in two parts; the following features are however incorrectly disclosed in the characterizing part since they were disclosed in document D1 in conjunction with the features stated in the preamble (Rule 6.3 b) PCT):

"[in that] the two tubular profiles are created in different ways in terms of material,

INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

International File Reference PCT/EP 03/06809

wherein the inner tubular profile is chosen according to its resilient restoring force and wherein the outer tubular profile is chosen according to its surface properties, in particular its ability to be coated, and in comparison to the inner tubular profile has a softer nature and a lower restoring force", and

"[wherein] the outer tubular profile consists of a sponge rubber or a soft rubber or of another elastomer such as, for example, an EPDM or a TPE".

In an identical manner, the feature "having a strip-like adhesive region that is intended to connect to one of the boundaries" was incorrectly disclosed in the preamble of Claim 1 since this is not known from document D1.

It should be noted that in document D1 the inner tubular profile provides the restoring force necessary for an excellent seal (see column 2, lines 48 to 52). It is thus implicitly stated that this inner tubular profile has a greater restoring force than the outer tubular profile, and vice-versa. Furthermore, the outer tubular profile is provided so as to provide a soft outer nature for the sealing profile.

DESCRIPTIONSealing profile

5 The invention relates to a sealing profile in accordance with the preamble of Claim 1.

Sealing profiles are known in a variety of forms and are in the form of either a solid or tubular profile, wherein the cross-sectional form and/or the material are chosen with the proviso that good adaptability to irregularities as well as to dimensional inaccuracies of the
10 gap to be sealed and sufficient restoration capabilities are ensured.

The sealing profile remains under elastic stress until it has fulfilled its sealing function, when it is pressed against the boundaries that are opposite one another and define the gap to be sealed. This pressing force in the region of the boundaries or sealing surfaces is to be
15 uniform over time under the respective operating conditions so that the sealing profile will deform back to its original shape during the transfer into an inactive unstressed state by converting the previously stored elastic energy.

Further essential properties for a sealing profile relate to surface properties, in particular
20 suitability for connection to other materials which is important for example in motor vehicle sealing profiles. Finally, the sealing profile has to be efficiently producible on the basis of the chosen material and must retain its properties, that are essential for fulfilling the sealing function, almost unaltered in a temperature range of at least -40°C to approximately +110°C.

The above requirements are only partly achieved by the currently known sealing profiles, in particular for tubular profiles.

5 A comparable tube-like sealing profile that is intended to be used in motor vehicle doors is known from EP 0 836 962 A1 and consists of an inner profile that surrounds a hollow space, consists of an open-cell foamed thermoplastic material having a low density and is surrounded on the exterior by a of a [sic] closed-cell foamed thermoplastic profile having a higher density. A lateral portion of the outer profile is used for attachment to structural parts e.g. of a motor vehicle door. Whilst the outer profile is used to provide sealing
10 properties as well as a pleasing visual appearance, the purpose of the inner profile is to provide resilient properties as well as a sufficient creep resistance. The outer profile having the character of a coating has a thickness between 0.5 mm and 1.0 mm, wherein this thickness is chosen in order to permit the sealing profile to be installed in accordance with small radii without any creases. The production of this known tubular profile can be
15 effected in two stages for example, wherein firstly the inner profile that has a relatively thicker wall thickness is produced during extrusion and wherein the second profile is then applied onto the first, once again using an extruder.

20 A further tube-like sealing element that consists of two profiles surrounding each other and is intended for use in motor vehicles is known from EP 0 822 052 A1, wherein the inner and outer profiles of the sealing element can equally consist of sponge rubber. The production of such a sealing profile assembled from two profile parts can be effected during co-extrusion. Whilst the outer profile is intended to provide the sealing functions, the inner profile is used to improve carrying capacity.

25 On the basis thereof, it is the object of the invention to create a sealing profile of the type mentioned in the introduction with regard to simple efficient production, sufficient

restoration capability, an excellent sealing capacity and such surface properties in the region of the outer surfaces which permit simple possibilities for applying a coating, such as an anti-friction lacquer, fiber coating or the like. This object is achieved for a sealing profile of the generic type by means of the features of the characterizing part of Claim 1.

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The tubular profile consists of two profiles that are disposed one inside the other and can be connected to each other. The basic principle of the subject matter of the invention resides in the fact that the two tubular profiles are to be chosen with the proviso that they each fulfill, in addition to a mere connecting capability, essential properties of the sealing profile such as, for example, sufficient restoration capability on the one hand and surface properties in the region of the outer surfaces on the other hand. Consequently, optimization of the two profiles in terms of construction and material is additionally provided, based on the possibilities for efficiently assembling the sealing profile and good adaptability to mechanical and thermal property requirements.

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The sealing profile in accordance with the invention is to be seen as a product which can be further processed to the greatest possible extent since its outer surface properties permit different possibilities for coating and adhering with other materials.

20 In accordance with the invention, a tubular profile combination is proposed, wherein it is hereby assumed that the resilient restoring force of the sealing profile is essentially applied by the inner tubular profile, whereas the outer tubular profile essentially has a sealing function since this, owing to its soft nature, permits precise adaptation to dimensional inaccuracies and inequalities in the region of the boundary surfaces defining the sealing gap. The pressing force necessary for maintaining the seal is applied by the elastic deformation of the inner tubular profile occurring during the sealing phase. By virtue of the fact that the inner tubular profile is produced from silicone and the outer tubular profile is

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produced from a sponge rubber, soft rubber or of another elastomer such as for example an EDPM or TPE, the above requirements can be fulfilled in every regard.

5 In accordance with the features of Claim 2, this material combination also permits efficient production possibilities during co-extrusion that is known *per se*.

10 The features of Claims 3 and 4 relate to alternative possibilities of coating the outer surface of the outer tubular profile. In this regard, the coating can be fiber coating, application of a lacquer e.g. an anti-friction lacquer or also a film that has been applied in a hot melt coating method.

15 In accordance with the features of Claims 5 and 6, the sealing profile in accordance with the invention can selectively be in an annular structure or as a wound product. In particular, in the case of the used material combination of the two tubular profiles, there is also the possibility of a subsequent, end-side adhesion process, in order to produce an annular structure.

20 It can be seen from the above embodiments that in the sealing profile in accordance with the invention a product is produced that fulfills all of the mechanical and thermal boundary conditions, can be used to the greatest possible flexible extent and can be used in particular in the automotive industry.

CLAIMS

1. Sealing profile (1) for sealing a gap between the outer boundary of a flat, movable first part and the inner boundary of an opening in a fixedly disposed second part that can be closed by the first part, for example for sealing the gap between a motor vehicle door and its allocated opening of a motor vehicle construction, having a strip-like adhesive region (2) that is intended to connect to one of the boundaries, having a tube-like construction surrounding a hollow space (3) and consisting of at least two tubular profiles that are disposed one inside the other and can be connected to each other,

characterized in that

the two tubular profiles are created in different ways in terms of material, wherein the inner tubular profile (5) is chosen according to its resilient restoring force and wherein the outer tubular profile (4) is chosen according to its surface properties, in particular its ability to be coated and in comparison to the inner tubular profile (5) has a softer nature and a lower restoring force and wherein the inner tubular profile (5) consists of silicone and the outer tubular profile consists of a sponge rubber or a soft rubber or of an elastomer such as, for example, an EPDM or a TPE.

2. Sealing profile (1) according to Claim 1, characterized in that the two tubular profiles are profiles that can be connected to the sealing profile during co-extrusion in an in-line process.
3. Sealing profile according to Claim 1 or 2, characterized by a coating such as an anti-friction lacquer or fiber coating etc. that is applied to the exterior of the outer tubular profile (4) and at least partly covers this outer surface.

4. Sealing profile (1) according to any one of Claims 1 to 3, characterized by a film that is connected to the exterior of the outer tubular profile (4), is applied in a hot melt coating method and forms an outer coating.

5 5. Sealing profile (1) according to any one of the preceding Claims 1 to 4, characterized by a construction as a wound profile.

6. Sealing profile according to any one of the preceding Claims 1 to 4, characterized by a closed, annular construction.

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